IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
Group Art Unit 2838

I, Maryann Wieczorek, hereby certify that this correspondence is being deposited with the United States Postal Service in a package as "Express Mail Post Office to Addressee," Mailing Label Number EV919561452US, addressed to, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Maryann Wieczorek
Signature

3/2/07
Date of Signature

In re

Patent Application of

Todd W. Johnson, et al.

Application No. 10/721,800

Confirmation No. 5088

Filed: November 24, 2003

Examiner: Edward H. Tso

"BATTERY PACK"

DECLARATION OF GARY MEYER UNDER 37 C.F.R. § 1.132

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Dear Sir:

I, Gary Meyer, declare as follows:

1. I am one of the inventors of the battery pack claimed in Application No. 10/721,800 (the "'800 patent application").

2. I am an employee of Milwaukee Electric Tool Corporation ("Milwaukee"), which is located at 13135 West Lisbon Road, Brookfield, Wisconsin 53005, where my title is Director, Advanced Engineering and Technology. I have been employed by Milwaukee since 1970 and have engineered products for the power tool industry for 35 years. I began my career at Milwaukee while I was an engineering student at Milwaukee School of Engineering (MSOE). I graduated from MSOE in 1972 with a Bachelor of Science degree in Electrical Engineering. In 1979, I established Milwaukee's research department, now known as Advanced Engineering and

Technology. This department focuses on the front-end development of technology for power tools. I became Director of Advanced Engineering and Technology in 1997.

3. The battery pack claimed in the '800 patent application includes a battery pack used to power one or more hand-held power tools. The battery pack includes a plurality of battery cells that have a lithium-based chemistry. Throughout this Declaration, I also refer to the claimed battery pack as the "battery pack invention," "Applicants' invention," "our invention," or "Milwaukee's battery pack invention." My statements herein apply to the battery pack invention in its various claimed forms in the '800 patent application, including, for example, a battery pack or an electrical combination that includes a battery pack.

4. As one skilled in the art of power tools and power tool batteries, it is my opinion that the battery pack invention provided a unique solution to a long-felt need in the art and would not have been obvious to anyone of ordinary skill in the art at the time of its invention. A large body of objective evidence that supports the nonobviousness of the battery pack invention is attached hereto as Appendices A-X. I discuss a portion of this evidence below.

5. **PERSISTENT NEED.** As cordless power tools became increasingly popular over several decades, users demanded increased battery power. Prior art battery technologies, such as nickel-cadmium (NiCd) and nickel-metal hydride (NiMH) technologies, were capable of providing higher power for heavy-duty jobs, but such power came at a cost: excessive battery weight. Thus, manufacturers could not produce high-power batteries that would be practical for use in the field; tools with such batteries would be too heavy to manipulate or transport. As such, manufacturers were limited to producing lightweight batteries that only could perform light-duty jobs.

6. For many years, the power tool industry unsuccessfully sought alternatives to prior art battery technologies. The conventional view in the industry was that one alternative battery chemistry, lithium, was too unstable for use in corded tool applications. With no heavy-duty yet lightweight cordless tools available, consumers were forced to choose between light-duty cordless tools or heavy-duty tools that were corded and inconvenient. However, with our battery pack invention, the solution to this industry need emerged. According to *Popular Science*, the battery pack invention allowed us to "create cordless tools that have never existed because of their heavy power demands."[1]

7. This persistent need for a solution has been recognized by those of ordinary skill in the art. For instance, numerous industry publications have conferred product innovation awards on the battery pack invention because of the persistent industry need that it solved. These awards include (1) 2005 Editors' Choice Grand Award by *Tools of the Trade*, (2) 2005 *Handy* Innovation Awards: Nine Groundbreaking New Products, (3) 2005 Breakthrough Award by *Popular Mechanics*, (4) 2005 Most Innovative Product by *Electrical Contracting Products*, (5) Top 10 Innovative Tools 2006 by *Workbench*, (6) Most Valuable Product by *Building Products Magazine*, (7) Co-recipient of 2006 Editors' Choice Grand Award by *Tools of the Trade*, and (8) 2006 Reader's Choice Award by *Woodshop News*.

8. The industry publications that presented these awards are highly regarded, well established, and widely distributed throughout the industry. The publications were highly selective in their presentation of awards. For example, *Electrical Contracting Products*, which reaches over 40,000 medium to large electrical contracting firms each month, selected only 18

[1] Appendix C, *Cordless Cuts Loose*, Popular Sci., Apr. 2005, at 13.

winners from a field of over 120 product finalists.[2] Similarly, *Tools of the Trade* selected only 16 winners of its 2005 Editors' Choice Awards and placed the battery pack invention at the top of that list as winner of the Editors' Choice Grand Award.[3]

9. In explaining their rationale for conferring these awards, industry publications articulated that the power tool industry needed a more powerful tool without the added weight provided by prior technologies:

> Each year it is our honor to recognize those in our industry who take tools and the tool industry to new levels. This year, our awards [include] **Milwaukee's giant technological leap in batteries and cordless tools.** . . .
>
> In the rapidly evolving world of cordless tools, there has been one constant: more power means a heftier, larger tool. Until now. **Milwaukee has broken new ground in the power vs. weight tug-of-war with its V28 line of lithium-ion 28-volt cordless tools that promise more power than standard 18-volters while weighing about the same**. Rising to this challenge has meant **cracking the battery code for lithium-ion batteries** (the same technology used in cell phones and laptops) to make them work in high-current-draw applications. After nine years of research and development, Milwaukee engineers used lithium manganese to formulate their lithium-ion technology, and, working with an energy partner, developed a cell with higher power and longer run-time. Internal tool circuitry allows the cell to be optimally used for wide temperature ranges, allowing the battery to be used with everything form a flashlight to a circ saw. **V28 is the result of vision and hard work that paid off. Independent research released by Milwaukee supports the company's claims** . . . .[4]

Handy described its award winners as "operating on a higher level than their predecessors":

> **Creating elegant solutions to difficult problems** is a tricky business. It's rare that a manufacturer surprises us by redefining or reinventing its offerings – and in the process changes our view of what is possible. Such products are good candidates for the HANDY Innovation Awards, as this years' winners demonstrate. Rather than rest on past successes, their creators rethought these products' purpose, how they're used and who uses them. **All of the 2005 Winners operate on a higher level than their predecessors** . . . .

[2] Appendix M, *Electrical Contracting Products Announces Winners of the 2005 INNOVATION Awards; Recognizing Outstanding Products in the Electrical Contracting Industry*, Black Enterprise Mag., Oct. 10, 2005.
[3] Appendix A, *2005 Editors' Choice Awards*, Tools of the Trade, May/June 2005, at 34, 35.
[4] Appendix A, *supra* note 3.

> **Since the early 1990s engineers have worked in vain to adapt lithium-ion (li-ion) battery technology to tools. . . . Milwaukee became the first major toolmaker to tap into Li-ion potential.**[5]

Popular Mechanics described the extensive research that its team of researchers and analysts conducted to select its award winners generally, and, specifically Applicants' solution to the industry need:

> The **breakthroughs recognized here were chosen after four months of research, hundreds of interviews, and consultation with a top-flight panel of advisers created for the purpose**. Together, these advances promise to transform energy production, empower the disabled and open new realms of exploration. Some of the innovations are already saving lives; others will enhance them. The future is sooner than you think. . . .
>
> **Since their Reagan-era introduction, cordless power tools have drilled, screwed and pounded their heads into the wall to try to match corded-tool performance**. The **Milwaukee V28 series** comes the closest yet, making its mark as **the first major tool line to use a lithium-ion battery instead of a nickel-cadmium, producing 28 volts instead of the competition's 18 volts**.[6]

10. In addition to the numerous innovation awards, a significant number of industry publications have acknowledged the groundbreaking nature of the battery pack invention against the backdrop of prior art technologies.[7] Commentators agree that the power tool industry's trend toward cordless tools had created the need for more power and better performance without added weight, and that the battery pack invention has solved this need. Specifically, one of Canada's foremost experts on the subject believes that many companies have long awaited a product having the benefits of the battery pack invention:

> **[Cordless] equipment [not having] the juice to perform as well as plug-in equivalents [is] a concern that might soon become obsolete**. Milwaukee Electric Tool Corp. has developed a new lithium-ion (LiIon) battery that packs more punch and runs longer than nickel-based cells. . . .

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[5] Appendix B, *Handy Innovation Awards 2005: Nine Groundbreaking New Products*, Handy, Nov./Dec. 2005, at 38, 39.

[6] Appendix D, Logan Ward, *Breakthrough Awards 2005*, Popular Mechanics, Nov. 2005, at 72, 81.

[7] Commentary not specifically discussed in this Declaration is attached as Appendix X.

> LiIon batteries have been used primarily in cell phones and digital cameras before this because of their ability to deliver high output when needed. **But they weren't practical for use in power tools because they had to be recharged frequently and – as a result – had a short life expectancy**. . . .
>
> **"There are a lot of companies – power-tool and medical companies – that have been waiting for this one," Buchmann ["One of Canada's foremost experts on the subject"] says of the new LiIion technology**. . . .
>
> **Cell-makers have been looking for a long-lasting alternative to the two main nickel-based battery chemistries – NiCad and nickel-metal hydride (NiMH) – for a very long time.**[8]

11. **NEED NOT SATISFIED BY ANOTHER.** Second, the need in the art was not satisfied by another before Applicants' battery pack invention. Despite many obstacles, including the conventional view that lithium was not a viable technology for power tool battery packs, we invented a solution to the need that plagued the power tool industry. Although we have numerous active competitors in the power tool industry, including Makita, Black & Decker, Hitachi, Max, Metabo, Panasonic, and Craftsman, none satisfied the need before the battery pack invention. Industry analysis devoted to the battery pack invention acknowledges that we were the first to satisfy the need and were, in fact, followed by our competitors. Commentators have referred to the battery pack invention as "an industry first"[9] and "the first of its kind,"[10] and acknowledged that Milwaukee "has shattered the weight/power barrier with a lithium-ion battery."[11] Moreover, industry analysts recognized that when Milwaukee's competitors launched their own lithium-ion battery products, the competitors "follow[ed] the lead of Milwaukee

[8] Appendix E, Don Sangster, *Cutting the Cord: Battery Basics for Builders*, On-Site, Mar. 2005, at 38, 40.
[9] Appendix F, Adam Rogers, *Chop Shop*, Wired, Sept. 2005, at 82.
[10] Appendix K, Andrew M. Carlo, *New Lines Add a Pop and Charge in TTI*, Home Channel News, Mar. 7, 2005, at 25.
[11] Appendix H, *Milwaukee Breaks The Battery Barrier*, Workbench, Aug. 2005, at 88.

Electric Tool."[12] Milwaukee's battery pack invention was also recognized in an equity research publication as a "competitive threat" to other power tool companies:

> Specifically, Milwaukee Tools, which was acquired by Chinese manufacturer Techtronic (TTI), recently introduced 28-volt lithium ion battery technology for power tools. This is **a significant advancement for cordless tools, as it marks the first time that a lithium ion battery (typically for cell phones and digital cameras) has been perfected for high-current draws**. . . . The bottom line here is that the **V28 technology opens the door for formerly corded products to potentially become cordless and is a significant competitive threat to BDK and Dewalt.**[13]

12. **INVENTION SATISFIES NEED.** Third, independent test results confirm that the battery pack invention satisfies the power tool industry's need described above. These tests were conducted by Intertek ETL SEMKO, an independent testing organization, which has conducted testing, inspection, and certification of products for manufacturers and retailers for over 100 years and operates over 250 laboratories in more than 99 countries throughout the world. Intertek compared the performance of Milwaukee's V28 line of power tools, the commercial embodiment of the battery pack invention, with the performance of representative cordless power tool products employing prior art battery chemistries, such as nickel-cadmium. The purpose of these tests was to determine the total number of actions that could be performed on a single battery charge. The test results showed that Milwaukee's lithium-ion products outperformed all other products tested. The Intertek test reports are attached as Appendix W.

13. The battery pack invention provides both the lighter weight and superior power needed by the power tool industry. Milwaukee obtained a sample of a battery pack employing a prior art battery chemistry and compared its weight and power to that of Milwaukee's V28 lithium-ion battery pack. Specifically, Milwaukee evaluated a NiCd battery pack (DeWalt's 18V XRP battery pack, Model No. DC9096), which weighs approximately 2.35 pounds and provides

[12] Appendix Q, *Makita Unveils Lithium-Ion Battery*, Rural Builder, Dec. 2005, at 61.

approximately 43.2 watt-hours of power. In comparison, Milwaukee's V28 lithium-ion battery pack weighs only approximately 2.27 pounds and provides approximately 84 watt-hours of power, nearly twice that of the NiCd pack.[14]

14. The numerous awards and the large amount of industry commentary further support the battery pack invention's satisfaction of the industry need for both a lighter and more powerful battery. Like commentary from other industry publications, an article from *Workbench* describes the superior performance and light weight of the battery pack invention:

> **The new battery, dubbed the V28, delivers an unprecedented 28 volts of power but still weighs *less* than an 18-volt battery**. The benefits of additional voltage are substantially more power and run time than 18-volt batteries. . . . We put the tools through some simple tests to measure what advantage the 28-volt platform offered. The V28 circular saw and drill outperformed their 18-volt counterparts nearly two-to-one and the 28-volt reciprocating saw completed about 30 percent more cuts than the 18-volt version.[15]

Another article, honoring the battery pack invention as a top 10 innovation of 2006, explicitly states that this invention "solves the weight problem":

> The march of cordless power stalled at 18 volts. That's the point where consumers proved unwilling to pay the high price or endure the weight of 24- and 36-volt cordless tools, even if it did mean more torque or longer run time. **Milwaukee, however is the first to breach the cordless power line by incorporating lithium-ion batteries**, which have longer run times and cooler operating temperatures than nickel-cadmium or nickel-metal-hydride batteries. **And at 28 volts, these pack a lot more power than competitor's batteries, at about the same weight as a conventional 18-volt battery**. **That solves the weight problem**.[16]

15. Furthermore, actual users of the Milwaukee V28 lithium-ion product line have responded very favorably to the battery pack invention. Milwaukee conducted focus groups of

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[13] Appendix I, Credit Suisse First Boston, *Competitors' Innovation, Another 2005 Headwind*, Jan. 25, 2005, at 1.
[14] The approximate power of a battery pack can be calculated by multiplying a battery pack's voltage by its capacity. For example, Milwaukee's V28 lithium-ion battery pack has a voltage of 28 volts and a capacity of 3.0 amp-hours (Ah). Therefore, the power of Milwaukee's V28 lithium-ion battery pack is calculated as follows: 28 V * 3.0 Ah = 84 watt-hours (Wh). Similarly, the power of an 18-volt and 2.4 Ah NiCd battery pack is calculated as follows: 18 V * 2.4 Ah = 43.2 Wh.
[15] Appendix H, *Milwaukee Breaks The Battery Barrier*, Workbench, Aug. 2005, at 88.
[16] Appendix R, *Top 10 Innovations*, Workbench, Feb. 2006, at 63.

actual contractors who used the new V28 lithium-ion tools, both in the field and at Milwaukee's facilities, and provided feedback concerning the tools' performance. These contractors noted the high power, light weight, and long battery life of the Milwaukee V28 lithium-ion tools compared to tools powered by prior art battery chemistries.[17]

16. For at least the above reasons, the battery pack invention is the first to fulfill a long-felt need for a solution to problems encountered in the power tool industry.

17. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Feb. 28, 2007
Dated

Gary Meyer

Enclosure: Appendices A-X

[17] Video clips of actual contractor focus groups and in-field product usage are available for the Milwaukee V28 lithium-ion product line at www.v28power.com/flash.htm through the following steps: (1) click twice on any of the tool images and (2) click "WATCH THE PROS" in the tool menu. In some instances, the video clips show contractors using a Milwaukee V28 lithium-ion tool and a prior art battery chemistry tool side-by-side. As the video clips illustrate, each V28 lithium-ion tool significantly outperforms the prior art battery chemistry tool and solves the long-felt need for a more powerful, lighter weight battery.